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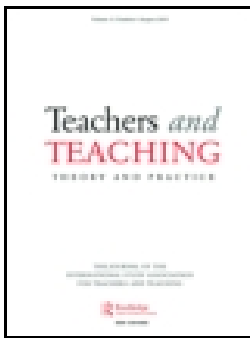
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The relationship between beginning teachers' stress causes, stress responses, teaching behaviour and attrition

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ABSTRACT

In this study, the relationships between beginning teachers' perceived stress causes, stress responses, observed teaching behaviour and attrition is investigated employing structural equation modelling (SEM). A total of 143 BTs were surveyed using the Questionnaire on the Experience and Evaluation of Work-BTs (QEEW-BT). Teaching behaviour was observed using the ICALT observation instrument. Results show that BTs' perceived negative pupil aspects relate positively to the stress responses perceived tension, discontent and negative emotions. Negative emotions, in turn, are negatively associated with observed teaching behaviour. This study also shows that discontent positively relates to attrition. Additionally, this study provides important cues to improve professional support programmes for BTs.

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BTs; stress; teaching behaviour; attrition

Introduction

The teaching profession is considered to be a highly stressful profession (Johnson et al., 2005; Newberry & Allsop, 2017). Teachers from many countries report high levels of stress (see e.g. Chaplain, 2008; Johnson & Birkeland, 2003; Kyriacou, 2001; Skaalvik & Skaalvik, 2015). In the Netherlands specifically, a figure from 2014 shows that ca. 1 out of 5 teachers experienced burnout symptoms. Teachers also reported higher levels of workload compared to other professionals (Hooftman, Mars, Janssen, de Vroome & Van den Bossche, 2015). Particularly, beginning teachers (BTs) seem to be more vulnerable to the pressures of the profession compared to experienced teachers (Gold & Roth, 1993). A recent study in the US showed that one-quarter of the BTs are at risk for stress in their first year (Fitchett, McCarthy, Lambert, & Boyle, 2018). Experiencing a high level of stress seems to be detrimental for teachers' well-being (Harmsen, Helms-Lorenz, Maulana, van Veen, & van Veldhoven, 2016) and may indirectly harm students' achievement (Ronfeldt, Loeb, & Wyckoff, 2013). It also seems to influence teachers' intension of leaving the profession/attrition (Jones & Youngs, 2012; Klassen & Chiu, 2011), their decision to leave teaching (Newberry & Allsop, 2017) and their teaching quality (Hanif, 2004).

Although the current knowledge on teacher stress gives an indication about the role of stress factors for outcomes such as well-being and attrition, the relationship between

teacher stress, teaching behaviour and attrition remains inconclusive due to the fragmented nature of research in studying the mentioned variables. Moreover, research examining the relationship between stress factors and teaching behaviour is scarce. Additionally, in the past attrition research was commonly studied from the ‘intention’ perspective instead of from the ‘actual’ perspective.

In order to fill in the voids in the existing teacher stress literature and how it relates to other important teacher factors, the present study aims to investigate the relationship between stress (causes and responses), teaching behaviour and actual attrition focusing particularly on BTs. Insight into these relationships can serve as important knowledge for (re)-designing support for BTs’ professional development.

Conceptual framework

Defining and modelling stress

Teacher stress can be defined as a teachers’ experience of unpleasant, negative emotions resulting from some aspects of their work (Kyriacou, 2001). According to van Veldhoven (1996), teacher stress consists of two components: (1) stress causes and (2) stress responses. Stress causes are the collection of aspects of the work content and the work situation influencing employees at cognitive, motivational and emotional levels. Stress responses are the employees’ mental interpretations when experiencing stress causes (van Veldhoven, 1996).

The job demands–resources model (JD-R model; Bakker & Demerouti, 2007) is a useful framework to understand the interplay between BTs’ stress causes, stress responses, teaching behaviour and attrition. The model depicts the relationship between work characteristics, well-being and organisational outcomes comprehensively. Two main psychological processes occur according to this model. The first, the health impairment process, describes the relationship between job demands, job resources, strain and organisational outcomes. The second process, the motivational process, assumes that job resources have motivational potential and lead to high work engagement, low cynicism and excellent performance. The present study focuses particularly on the health impairment process (see Figure 1). Job demands are described as ‘physical, psychological, social, or organisational aspects of the job that require sustained physical and/or psychological (cognitive and emotional) effort or skills (Bakker & Demerouti, 2007). In the teaching context, this could, for example, be pupil misbehaviour. Job demands are not necessarily negative, but the demands may function as stress causes when meeting those demands requires high effort from an employee who has not adequately recovered from earlier demands. Hence, job demands are conceptually related to stress causes.

Job resources refer to physical, psychological, social or organisational aspects of the job that are either/or: functional in achieving work goals, reduce job demands and the associated physiological and psychological costs, stimulate personal growth, learning and development (Bakker & Demerouti, 2007). Induction programmes (see Helms-Lorenz & Maulana, 2016) include support for professional development by providing feedback and social support via mentoring programmes and BT group meeting sessions. Therefore, induction programmes can be seen as a form of job resources. In line with this, it was found that the lack of experienced support is related to pre-service and BTs’ sense of burnout (Fives,

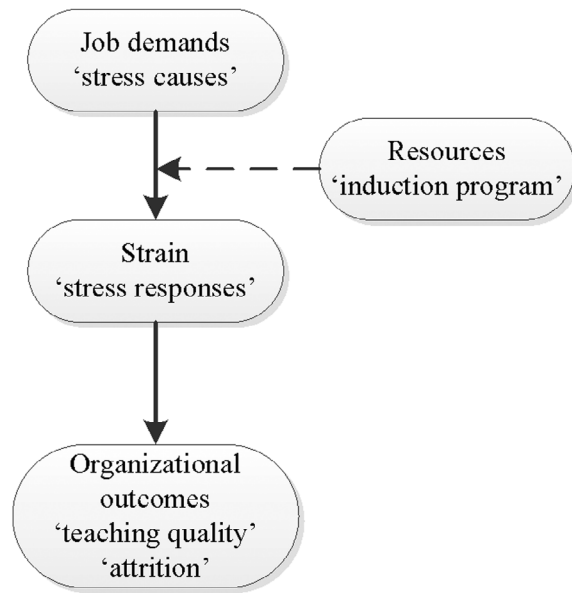


Figure 1. Proposed conceptual model of stress based on the Job Demands–Resources model (Bakker & Demerouti, 2007).

Hamman, & Olivarez, 2007; Gavish & Friedman, 2010) and that support is essential for retention (Ooghe, Thomas, Tuytens, Devos, & Vanderlinde, 2016).

The JD-R model posits that high job demands can exhaust employees' mental and physical resources leading to psychological strain. Examples of psychological strain are job-related anxiety, exhaustion and dissatisfaction (Bakker & Demerouti, 2007). Hence, psychological strain is conceptually related to stress responses (tension, negative emotions and discontent) in this study. The psychological strain can lead to negative organisational outcomes like poor performance, health-related problems and absenteeism (Bakker, Demerouti, & Sanz-Vergel, 2014). Consistently, recent research shows that teachers who experienced high classroom demands but low classroom resources reported less job satisfaction (McCarthy, Lambert, Lineback, Fitchett, & Baddouh, 2015).

Stress causes and stress responses

Teachers deal with a wide variety of stress causes on a daily basis. A number of stress causes for teachers, including high job demands, pupil misbehaviour, poor working conditions, poor relationships at work, role conflict, role ambiguity, lack of autonomy, poor school ethos and lack of developmental opportunities, were revealed in many studies (see Hanif, 2004 for a detailed review). Pupil misbehaviour and high job demands are perceived as most stressful (Clunies-Ross, Little, & Kienhuis, 2008). This is particularly true for the majority of BTs (Borg & Riding, 1991).

These stress causes correlate with stress responses. In a meta-analyses including 65 studies on teacher stress covering a wide variety of teaching experience, a moderate correlation was found between external stressors (i.e. student misbehaviour) and negative emotional

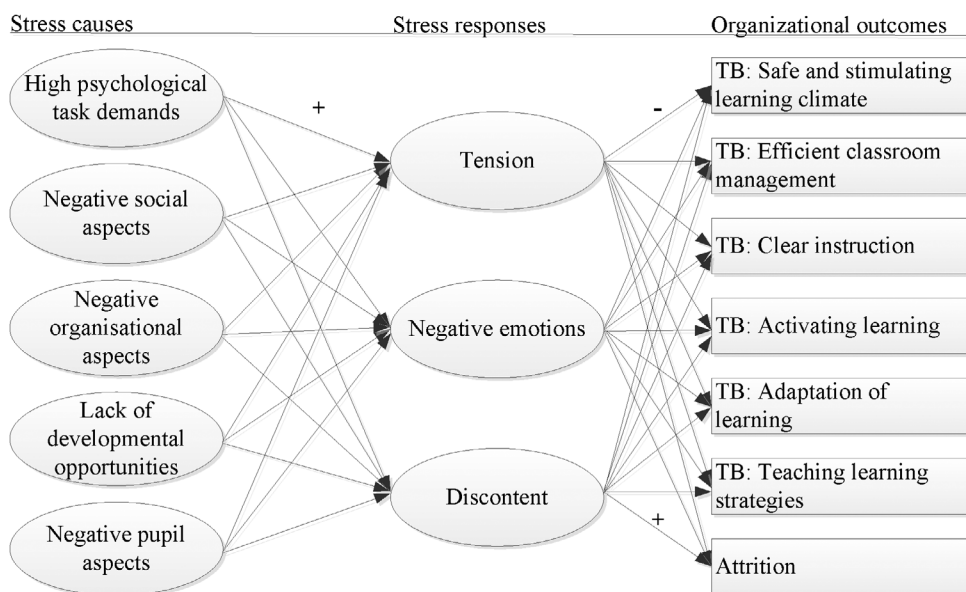


Figure 2. Hypothesised model of stress causes stress responses, teaching behaviour and attrition.
Note: TB stands for teaching behaviour.

responses (Montgomery & Rupp, 2005). Similarly, Jennings and Greenberg (2009) highlighted the importance of healthy teacher–student relationships for teachers’ well-being.

A recent study investigated components of stress causes and stress responses that are particularly relevant for BTs. The study highlighted important stress causes components such as high psychological task demands, negative social aspects, negative organisational aspects, lack of developmental opportunities and negative pupil aspects. Important components of stress responses include tension, discontent and negative emotions (Harmsen et al., 2016). High job demands, lack of learning opportunities, lack of autonomy and influence and lack of social and organisational job support experienced by BTs were found to be positively related to their tension and discontent (Harmsen et al., 2016). In addition, perceived pupil misbehaviour and poor relationship with pupils were found to be positively related to experienced tension, discontent and negative emotions (Harmsen et al., 2016). Therefore, we expect that stress causes are positively related to stress responses.

Stress responses and teaching behaviour

Several studies have investigated the relationship between stress causes and job performance (Gilboa, Shirom, Fried, & Cooper, 2008; Tubre & Collins, 2000). In general, positive but not particularly strong relationships were found (Jex, 1998). To justify this finding, Jex (1998) contends that in many cases the relationship between stress causes and job performance might be indirect. In line with our proposed model (see Figure 2), Jex argues that job-related stressors may induce negative emotional states that, in turn, impact performance.

Research concerning the relationship between teachers’ stress responses and actual teaching behaviour is scarce, as most studies focus on perceived performance (e.g. Betoret, 2009; Kokkinos, 2007). It was found that the degree to which teachers respond emotionally to

stressful events has a strong negative influence on their degree of perceived performance (Montgomery & Rupp, 2005). Jennings and Greenberg (2009) also highlighted the importance of the ability to adequately respond socially and emotionally to a classroom situation in order to maintain effective classroom management.

An exception is the research of Hanif, Tariq, and Nadeem (2011) examining the relationship between stressors and actual teaching performance of teachers with a minimum of one-year teaching experience. The study showed that stress experienced by teachers was negatively related to their teaching behaviour. This study relies solely on students as observers of teaching behaviour, which is mentioned by the authors as a limitation. Our study attempts to address this limitation using an observation instrument used by experienced teachers to evaluate teaching behaviour. Consistent with Hanif et al. (2011), we expect that BTs' stress responses are negatively related to teaching behaviour.

Stress responses and attrition

Teacher attrition, especially during the early years of the teacher career, is a serious problem in many Western societies (Borman & Dowling, 2008; Heikkinen, Jokinen, & Tynjälä, 2012; Ingersoll, 2007). 'As an educational issue, teacher attrition refers to the need to prevent good teachers from leaving the teaching job for the wrong reasons' (Kelchtermans, 2017, pp.961). In the United States, it is estimated that between 20 and 50% of public school teachers leave the profession within the first five years of their career (Gray & Taie, 2015; Ingersoll, 2003). In countries like Belgium, the UK and Australia, this percentage is ca. 25% (Australian Government Productivity Commission, 2012; House of Commons Education Committee, 2012; Vlaams Ministerie van Onderwijs en Vorming, 2013). In the Netherlands particularly, the attrition rate among BTs is approximately 15% (Helms-Lorenz, van de Grift, & Maulana, 2016). This figure is relatively lower compared to the countries mentioned above. Nevertheless, the causes of attrition are comparable to those reported elsewhere (den Brok, Wubbels, & van Tartwijk, 2017).

Attrition was related to stress (Scheopner, 2010). Nevertheless, research linking teacher stress to actual teacher attrition is scarce (Helms-Lorenz et al., 2016) as most research focuses on teachers' intention to quit the job (e.g. Jones & Youngs, 2012; Klassen & Chiu, 2011; Pogodzinski, Youngs, & Frank, 2013). Interview studies with teachers who left the teaching profession revealed that high job demands, lack of support, lack of learning opportunities, poor working conditions, lack of work pleasure and pupil misbehaviour contribute to explaining attrition (Buchanan, 2010; Gonzalez, Brown, & Slate, 2008). These stress causes and lack of resources result in emotional exhaustion, which significantly relate to intention to leave the profession (McCarthy et al., 2015; Skaalvik & Skaalvik, 2011). Consistently, we expect that BTs' stress responses are positively related to attrition.

Purpose of the study

The aim of the present study is to examine the relationship between stress causes, stress responses, teaching behaviour and attrition in the context of BTs. From the literature reviewed earlier, it can be concluded that stress causes are positively related to stress responses. Stress responses are negatively associated with teaching behaviour, and positively related to attrition (see Figure 2 for the hypothesised model). However, it remains

inconclusive which specific aspects of stress causes (e.g. high psychological task demands, negative social aspects and negative pupil aspects) are positively related to specific aspects of stress responses (tension, discontent, negative emotions). It also remains unclear which aspects of stress responses are negatively associated with aspects of teaching behaviour. Additionally, we know little as to which aspects of stress responses are positively related to attrition.

To guide our research, the following research questions were addressed:

- (1) Which aspects of BTs' perceived stress causes are positively related to perceived stress responses?
- (2) Which aspects of BTs' perceived stress responses are negatively associated with observed teaching behaviour?
- (3) Which aspects of BTs' perceived stress responses are positively related to attrition?

Method

Procedure and participants

The sample consisted of 143 BTs ($M = 28$ years old, $SD = 7$) from 61 different secondary school locations in the Netherlands. The percentage of female teachers is slightly higher (57.3%) compared to the national secondary school teachers population (46.7%; Ministry of Education, 2014). The term BTs refers to teachers who recently obtained their teaching qualification and who had less than three years' experience in the teaching profession. The percentage of qualified teachers in the current sample is higher (100%) than in the national population (88.2%).

All BTs received induction programmes including: (1) workload reduction (e.g. not being a mentor and working less actual teaching hours); (2) supporting effective teacher behaviour in the classroom (e.g. being observed and receiving feedback from an experienced teacher); (3) supporting school enculturation (e.g. receiving information on school rules and procedures); and (4) supporting professional development (e.g. having BT meetings to exchange experiences between BTs).

The data were collected during a period of two months. Participation in the study was entirely voluntary and informed consent was collected from all the participants.

Measures

Perceived stress causes and stress responses

BTs perceived stress causes and stress responses were measured with the valid and reliable Questionnaire on the Experience and Evaluation of Work for BTs (QEEW-BT; Harmsen et al., 2016). The questionnaire consists of 170 questions rated on a four-point Likert scale ranging from 1 (never) to 4 (always) measuring five stress causes: high psychological task demands (e.g. many hours of actual teaching), negative social aspects (e.g. poor relationship with colleagues or supervisor, poor school climate), poor organisational aspects (e.g. lack of feedback, role clarity), lack of development opportunities (e.g. lack of learning opportunities), negative pupil aspects (e.g. pupil misbehaviour, poor relationships with pupils) and three stress responses: discontent (e.g. lack of organisational commitment, intension

to quit), tension (e.g. rumination, tiredness during work) and negative emotions (e.g. emotional reactions during work, lack of work pleasure).

Teaching behaviour

BTs' teaching behaviour was measured using the valid and reliable International Comparative Analysis of Learning and Teaching (ICALT; van de Grift, 2014) instrument. The instrument consists of 32 items measuring six domains of teaching behaviour, namely; (1) safe and stimulating learning climate, (2) efficient classroom management, (3) clear instruction, (4) activating learning (e.g. the teacher uses teaching strategies that activate the students), (5) adaptation of teaching (e.g. the teacher differentiates his/her instruction to tailor to the students' teaching needs) and (6) teaching learning strategies (e.g. the teacher teaches the students how to check whether their answers are correct). Response categories were provided on a Likert scale ranging from 1 (predominantly weak) to 4 (predominantly strong). Experienced teachers served as observers who received a four-hour intensive training beforehand. In this group training session, the observers first received instructions on how to use the instrument. Where after, they practised using the instrument twice by scoring two video lessons. After scoring the first video, the group discussed and resolved scoring discrepancies, if any existed. For the second video, observers needed to reach 70% consensus or higher on their observation scores in order to receive an observer qualification certificate.

Attrition

BTs' attrition was registered when teachers left their first teaching job within the one-year period of this study.

Statistical analyses

Preliminary descriptive analyses, correlation analyses, reliability analyses and logistic regression analyses were conducted (using SPSS 23). In addition, structural equation modelling (SEM, using Mplus 7) was used to test the hypothesised relationship between stress causes, stress responses, teaching behaviour and attrition. As attrition is a binary variable, two separate models were tested.

The first SEM model tested the relationships between stress causes, stress responses and teaching behaviour. The second SEM model investigated the relationships between stress causes, stress responses and attrition. To evaluate the goodness of fit, the comparative fit index (CFI), the root mean square error of approximation (RMSEA) and the standardised root mean square residual (SRMR) were used. Following the general guidelines, the following threshold values were used to determine good and appropriate fit. For CFI and TLI, a value close to .95 was considered appropriate (Hu & Bentler, 1999). For the RMSEA measure, a value of .06 indicates good fit (Hu & Bentler, 1999) and values ranging from .08 to .10 indicate mediocre fit (MacCallum, Browne, & Sugawara, 1996). For SRMR, a value less than .08 was considered as appropriate and values between .08 and .10 as moderate fit.

Table 1. Descriptive statistics and reliability of the scales considered in this study ($n = 143$).

	Scale	Mean	SD	Range	Cronbachs alpha	Number of items	<i>n</i>
<i>Stress causes</i>	High psycho- logical task demands (F1)	6.26	2.14	0–18.6	.91	31	
	Negative social aspects (F2)	5.13	2.12	0–16.5	.90	22	
	Poor organisa- tional aspects (F3)	5.45	1.83	0–12	.81	8	
	Lack of de- velopment opportunities (F4)	4.19	1.83	0–14	.86	14	
	Negative pupil aspects (F5)	10.22	3.45	0–25	.92	25	
<i>Stress responses</i>	Discontent (F6)	3.99	1.78	0–18	.78	12	
	Tension (F7)	7.71	3.38	0–24.8	.94	33	
	Negative emo- tions (F8)	5.07	2.73	0–25.5	.86	17	
<i>Teaching behav- iour</i>	Safe and stimu- lating learning climate	3.37	.50	1–4	.74	4	
	Efficient classroom management	3.21	.56	1–4	.73	4	
	Clear instruction	3.0	.57	1–4	.82	7	
	Activating learning	2.56	.63	1–4	.79	7	
	Adaptation of teaching	1.96	.72	1–4	.81	4	
	Teaching learn- ing strategies	2.04	.76	1–4	.88	6	
<i>Attrition</i>						6 leavers, 137 stayers	

Results

Preliminary analysis

Results of the reliability analyses showed that all the scales in this study are reliable (Cronbach's alpha: .73–.94, see Table 1). Results of the descriptive analyses showed that BTs experience a relatively high level of stress due to negative pupil aspects and poor organisational aspects (see Table 1). Furthermore, 6 BTs left their first school or the profession, while the remaining 137 stayed.

Results of the correlation analyses showed that all stress causes have significant correlations with discontent and tension. Only organisational aspects and pupil aspects have significant correlations with the stress response negative emotions. Further, negative emotions correlate significantly with teaching behaviour domains (see Table 2).

Pathway analysis 1: stress causes, stress responses and observed teaching behaviour

For parsimonious reasons, the first tested multivariate multiple regression model was a model in which all stress causes aspects which had correlations equal to or greater than .15

Table 2. Pearson's bivariate correlations among variables considered in this study (*n* = 143).

	F1	F2	F3	F4	F5	F6	F7	F8	1	2	3	4	5	6
<i>Stress causes</i>														
F1 High psychological task demands	1													
F2 Negative social aspects	.37**	1												
F3 Negative organisational aspects	.36**	.41**	1											
F4 Lack of development opportunities	.17*	.29**	.23**	1										
F5 Negative pupil aspects	.25**	.31**	.28**	.19*	1									
<i>Stress responses</i>														
F6 Discontent	.30**	.49**	.37**	.27**	.46**	1								
F7 Tension	.63**	.26**	.29**	.15*	.31**	.32**	1							
F8 Negative emotions	.07	.02	.18*	.04	.47**	.16*	.29**	1						
<i>Teaching behaviour</i>														
(1) Safe and stimulating learning climate	.09	-.01	-.12	.03	-.31**	-.10	-.01	-.25**	1					
(2) Efficient classroom management	.07	-.10	.01	.06	-.35**	-.10	.04	-.22*	.61**	1				
(3) Clear instruction	.09	.03	-.05	.06	-.25**	-.01	.08	-.20*	.66**	.68**	1			
(4) Activating learning	.10	-.02	-.02	-.07	-.22*	.01	.03	-.21*	.55**	.41**	.71**	1		
(5) Adaptation of teaching	.01	.04	.06	.01	-.17*	.07	.01	-.13	.20*	.23**	.32**	.46**	1	
(6) Teaching learning strategies	-.06	-.16	-.09	-.12	-.22*	-.04	-.08	-.17*	.28**	.24**	.43**	.66**	.54**	1

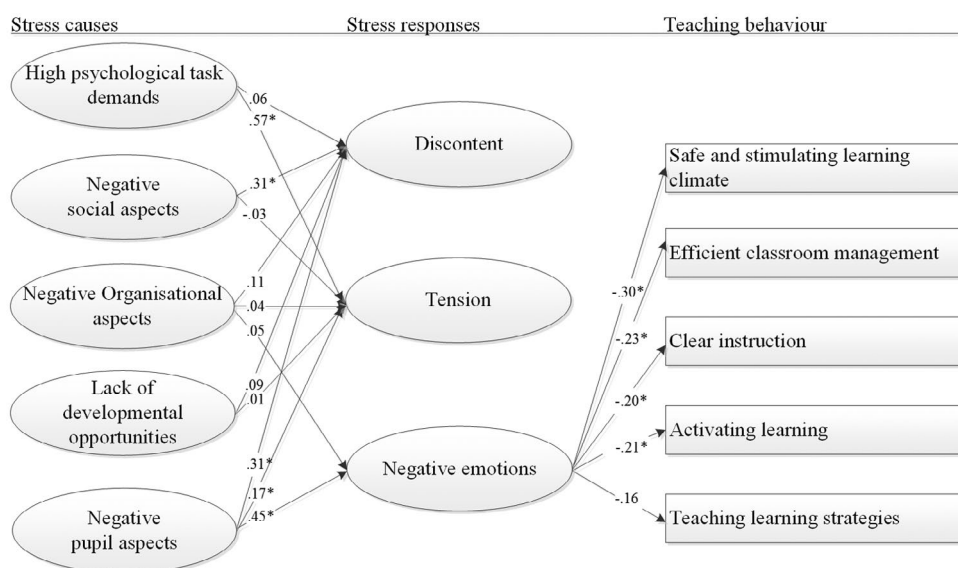


Figure 3. Model 1: structural model depicting the relationship between stress causes response and teaching behaviour in beginning teachers, standardised model results. *Significant ($p < .05$); fit indices: good-of-fit statistics: CFI = .97, RMSEA = .06, SRMR = .06.

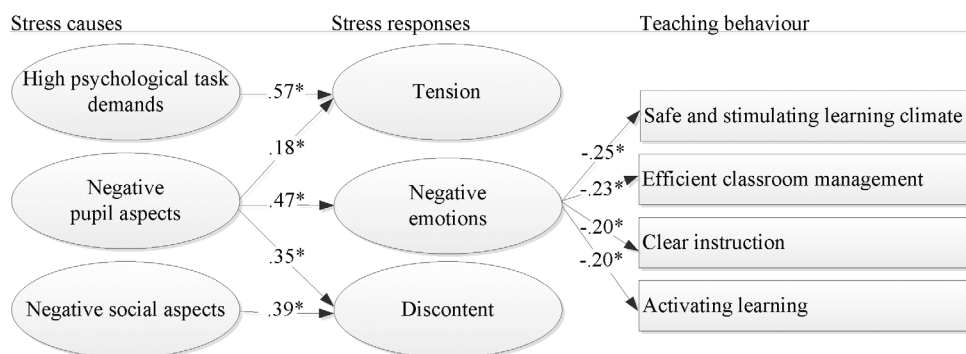


Figure 4. Model 2: structural model depicting the relationship between stress causes, stress responses and teaching behaviour in beginning teachers, standardised model results. *Significant ($p < .05$); fit indices: goodness-of-fit statistics: CFI = .97, RMSEA = .07, SRMR = .07.

with the stress responses aspects, and all the stress responses which had correlations equal or greater than .15 with the teaching behaviour aspects were entered (see Model 1, Figure 3).

The goodness-of-fit statistics showed that the model fits the data well. CFI = .97, TLI = .93, RMSEA = .06, SRMR = .06. However, several structural paths were not statistically significant and were therefore removed. The final model had an appropriate fit with CFI = .97, TLI = .93, RMSEA = .07, SRMR = .07 (Model 2, Figure 4).

Which specific aspects of BTs' perceived stress causes are positively related to perceived stress responses?

Results showed that perceived high psychological task demands ($\beta = .57, p < .01$) and negative pupil aspects ($\beta = .18, p < .01$) are significantly and positively related to perceived tension (see Figure 4). The more psychological task demands and negative pupil aspects the BT experienced, the more tension they experienced. The perceived negative pupil aspects and high psychological task demands together explain about 42% of the variance in tension.

The perceived negative pupil aspects ($\beta = .47, p < .01$) are also significantly and positively related to perceived negative emotions. The poorer the relationship with pupils and the more pupil misbehaviour a BT experienced, the more negative emotional reactions during work and lack of work pleasure a BT experienced. The perceived negative pupil aspects explain about 22% of the variance in perceived negative emotions.

Moreover, perceived negative social aspects ($\beta = .39, p < .01$) and negative pupil aspects ($\beta = .35, p < .01$) are significantly and positively related to perceived discontent. The more BTs experience negative social aspects and negative pupil aspects, the more they experience discontent. Perceived negative social aspects and negative pupil aspects together explain about 35% of the variance in discontent.

Which specific aspects of BTs' perceived stress responses are negatively associated with observed teaching behaviour?

BTs' perceived negative emotions are significantly and negatively related to teaching behaviours in terms of safe and stimulating learning climate ($\beta = -.25, p = .01$), efficient classroom management ($\beta = -.23, p = .02$), clear instruction ($\beta = -.20, p = .03$) and activating learning ($\beta = -.20, p = .03$) (see Figure 4). Negative emotions explain about 7% of the variance in safe and stimulating learning climate, 5% of the variance in efficient classroom management, 4% of the variance in clear instruction and 3% of the variance in activating learning. BTs experiencing more negative emotions during work showed a significantly lower quality in: safe and stimulating learning climate, efficient classroom management, clear instruction and activating learning.

Pathway analysis 2: stress causes, stress responses and attrition

To investigate the relationships between stress causes, stress responses and attrition, a logistic regression path model was conducted. The logistic regression path model (Model 3) was partly based on Model 2. The significant paths between stress causes and stress responses from Model 2 were added to Model 3. In addition, for each stress response it was examined whether the path between the stress response and attrition was significant. Only significant paths were added to the model. The path between discontent and attrition was significant ($X^2 = 6.34, p = .001, df = 1$, with $\text{Exp}(b) = 1.61, b = .48, SE = .02$, Nagelkerkes $R^2 = .11$) and was therefore added to the Model (see Figure 5).

Which specific aspects of BTs perceived stress responses are positively related to attrition?

The result of the logistic regression analysis showed that discontent is related to attrition (see Figure 5). The analysis provided odds ratio, which can be interpreted as the multiplicative change in the odds for a one unit change in the predictor variable. For BTs who experience

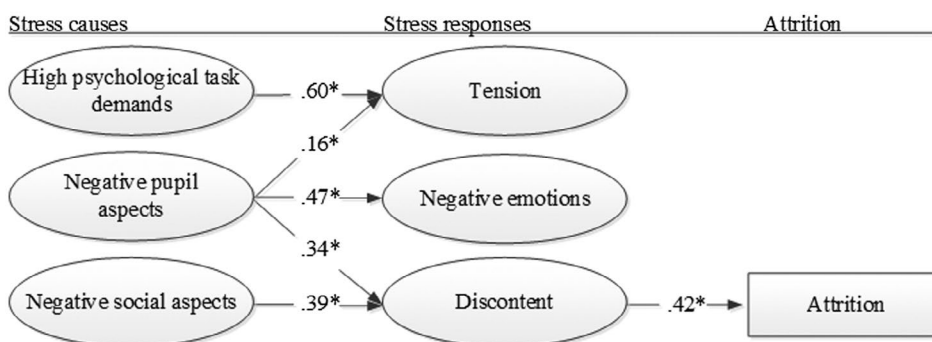


Figure 5. Model 2: (logistic) regression model that relates stress causes, stress responses and attrition in beginning teachers, standardised model results. *Significant ($p < .05$); fit indices: AIC = 1927.76, BIC = 1969.24.

high discontent, the odds of leaving the school or profession are 1.61 larger than teachers who experience less discontent.

Discussion and conclusions

In this study, the relationship between BTs' perceived stress causes, stress responses, observed teaching behaviour and attrition was investigated. It was found that all five stress causes (high psychological task demands, negative social aspects, negative organisational aspects, lack of developmental opportunities and negative pupil aspects) have positive and significant relationships with one or more of the stress responses. However, when these stress causes are estimated all together, high psychological task demands, negative pupil aspects and negative social aspects appear to be stronger and more stable predictors of stress responses in BTs.

We found that negative pupil aspects are significantly and positively related to tension, negative emotions and discontent. This is in line with research showing that the quality of student–teacher relationships influences job outcomes (Fransson & Frelin, 2016; Veldman, Admiraal, van Tartwijk, Mainhard, & Wubbels, 2016). Therefore, teachers' work associated with pupil aspects needs close attention when (re)designing professional support for BTs. We also found that high psychological task demands are strongly and positively related to tension. The finding that especially the stress causes negative pupil aspects and high psychological task demands explain variance in the stress response(s) is in line with previous research showing that these stress causes are perceived as most stressful (Clunies-Ross et al., 2008) particularly by BTs (Borg & Riding, 1991), and are related to teacher burnout (Burke, Greenglass, & Schwarzer, 1996; Byrne, 1991; Kelly & Northrop, 2015).

Negative social aspects were found to be stronger and more stable predictors of discontent, whereas high psychological task demands were found to be stronger predictors of tension. This finding is line with van Veldhoven, Taris, de Jonge, and Broersen (2005) who stated that quantitative/qualitative demands are related primarily to psychological strain outcomes, while lack of support is related primarily to the attitudinal outcomes. The present study shows that the attitudinal outcome discontent is strongly and positively related to attrition. This suggests that BTs who leave their first school/the profession experience more discontent compared to teachers who stay at their first school. Previous research already

showed the link between job dissatisfaction and intention to leave. This study contributes to the stress research by further showing that BTs' dissatisfaction with their job is related to actual attrition.

Recent research also highlights the importance of social-professional support and its relationship with staying or leaving the teaching profession. Newberry and Allsop (2017) showed that the timing and intensity of challenges like high workloads and pupil misbehaviour matter for teachers' decision to stay/leave, but the effects are mitigated by the strength of personal and professional relationships. The researchers argue that it is not necessarily the challenge of the job nor the characteristics of the individual, but the structure of the social-professional support that determines whether teachers stay or leave the profession. Similarly, Kelchtermans (2017) argues that professional core relationships (e.g. relationships with students, colleagues, principal) operate as 'double-edged swords' as they are the most important sources for positive job outcomes (e.g. satisfaction and motivation) as well as for negative job outcomes (e.g. stress, burnout).

It is unclear why tension is not related to attrition nor to teaching behaviour. As a possible line of reasoning, it might be that as the BTs in this study received professional support through induction programmes including workload reduction; the workload reduction reduced BTs' high psychological task demands and therefore indirectly reduced the experienced tension. This line of reasoning was confirmed in recent research indicating that workload reduction decreases the level of perceived high psychological demands (Harmsen, Helms-Lorenz, Maulana, & van Veen, 2017). Subsequently, we argue that the reduced experienced task demands might lessen the expected effect on teaching behaviour and/or attrition. Additionally, experiencing tension during a short period of time might not necessarily affect teaching behaviour and/or attrition significantly, whereas experiencing tension over a longer period of time might be more powerful to determine negative (changes) in behaviour and/or attrition.

Similarly, this study does not reveal a significant relationship between negative emotions and attrition. This is not in line with the previous longitudinal research showing that the suppression of unpleasant emotions decreases job satisfaction, which in turn increases intention to quit (Côté & Morgan, 2002). The induction programme and the time span might have mitigated this relationship. Recent research shows that the induction programme elements including workload reduction and support for effective teaching behaviour decrease the level of negative emotions among BTs (Harmsen et al., 2017). Whether the two induction elements mitigated the relationship between negative emotions and attrition remains unclear, and is an important subject for future research.

Past research showed the link between teacher stress and student perceptions of teaching behaviour (Hanif et al., 2011), and between stress and perceived personal accomplishment (Betoret, 2009; Kokkinos, 2007). The present study extends the body of knowledge by showing that negative emotions are related to actual teaching behaviour. This is in line with a recent qualitative study showing that negative emotions stemming from a strained relationship with a mentor and a poor school climate can be so overwhelming that it influences a BT's teaching practice (Yuan & Lee, 2016).

Notwithstanding the strengths, the present study also has some limitations. The cross-sectional design of the present study is one of those limitations. All constructs were measured once, while measuring them multiple times would provide a better picture of the more representative relationships between the mentioned constructs (Brouwers & Tomic, 2000;

Côté & Morgan, 2002). Another limitation of this study is that the observed teaching behaviour was measured during approximately the same period as the stress measures. The order of the measurement is therefore not strictly the same for all teachers. For that reason, the interpretation is limited to the relationship between stress responses and observed teaching behaviour, ruling out any interpretations regarding the causality and potential reciprocal relationships (see Helms-Lorenz et al., 2016). Moreover, although this study showed the direct influence of stress responses on teaching behaviour, previous research shows that (coping) behaviour can mediate the relationship between stress causes and stress responses (Golparvar, 2016; Montgomery & Rupp, 2005). Therefore, the exploratory nature of this study should be highlighted and more research is needed to fully understand the order in which these processes take place.

Furthermore, although about 20% of BTs participating in this study left their first school, the present study might suffer from sample imbalance and representativeness due to the inclusion of only six teachers falling into attrition in the analysis (the remaining teachers with attrition did not respond). Finally, all teachers in this sample received induction arrangements. This might have influenced the response patterns and magnitude of the relationships between the constructs under study. The induction arrangements could have functioned as resources and therefore mitigating the relationship between stress causes and stress responses.

Recent research shows that exposure to induction programmes is found to be associated with first-year teachers' risk for stress. Teachers with less risk for stress were three times more likely to have a reduced schedule (workload reduction), they were also more likely to attend seminars, receive supportive communication from administrators, receive common planning time and were more often provided extra help compared to teachers with more risk for stress (Fitchett et al., 2018). The possible mediating influences of induction arrangements in the relationship between teachers stress, performance and attrition remain unclear and therefore more research is needed.

Practical significance

This study highlights that experienced negative pupil aspects are directly related to tension, negative emotions and discontent. In addition, this study shows that negative emotions are related to teaching behaviour, and discontent to attrition. Because relationships with pupils are central to teachers, future efforts to reduce teacher stress, attrition and the negative effect of stress should be directed towards the improvement of teacher–student relationships. It seems that learning how to cope with student misbehaviour and to improve poor teacher–student relationships effectively would take a great amount of the pressure away. Teachers in this study received induction arrangements including support for effective teaching behaviour in the classroom and support for professional development. However, support for teacher–student relationships might still be underrepresented and could be enhanced by, for instance, school-based and classroom-based social, emotional and behaviour programmes (see www.vriendelijkordehouden.nl). This programme is aimed to increase social skills and decrease antisocial behaviour (Sklad, Diekstra, Ritter, Ben, & Gravesteyn, 2012) which seems to offer benefit for (beginning) teachers in the effort to improve relationships with their students and thus contribute to potential stress reduction.

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